

REMARKS

This Amendment is being filed in response to the Final Office Action mailed March 18, 2009, which has been reviewed and carefully considered. Entry of the present amendment and allowance of the present application in view of the amendments made above and the remarks to follow are respectfully requested.

Claims 1-7, 10-17, and 25-28 remain in the Application. Claims 1, 7, 10 and 17 are independent.

In the Final Office Action, the drawings are objected to because allegedly FIG 6 does not describe the example on page 5 of the specification. This objection is respectfully traversed. However, in the interest of advancing prosecution, the specification has been amended for better conformance with FIG 6. It is respectfully submitted that the objection to the drawings has been overcome and an indication as such is respectfully requested.

In the Final Office Action, the Examiner objected to claims 4, 13, and 25-27 allegedly for certain informalities. This objection is respectfully traversed. Regarding claims 4 and 13, FIG 6 clearly shows that the original hardness at the center of the

diffusion layer is 200HV, which is now also included in the specification as amended. Regarding claims 25-27, while it is true that there are embodiments where the hardness of the hardened supersaturated surface top layer is not at least six times the original hardness at the center of the diffusion layer, nevertheless there are also further embodiments where the hardness of the hardened supersaturated surface top layer is at least six times the original hardness at the center of the diffusion layer, as recited in claims 24-27 and shown in FIG 6, where the hardened supersaturated surface top layer has a hardness of 1500HV compared to the original hardness of 200HV, where 1500 is at least six times 200. It is respectfully submitted that the objection to claims 4, 13, and 25-27 has been overcome and an indication as such is respectfully requested.

In the Final Office Action, the Examiner provisionally rejected claim 17 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of a copending Application No. 10/522,287. This rejection is respectfully traversed. However, it is respectfully submitted that Applicants will consider filing a terminal disclaimer, if necessary

in view of any allowable claims, upon indication that the present application is otherwise allowable or includes allowable claims.

In the Final Office Action, claims 1-7, 10-17 and 25-28 are rejected under 35 U.S.C. §112, first paragraph. This rejection is respectfully traversed. However, to advance prosecution, the specification has been amended to include a better description of FIG 6, and to provide better support for independent claims 1, 7, 10 and 17. It is respectfully submitted that this rejection of claims 1-7, 10-17 and 25-28 has been overcome. Accordingly, withdrawal of this rejection is respectfully requested.

In the Final Office Action, claims 1, 4-7, 10, 13-14, 16 and 25-27 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,354,008 (Domoto) in view of JP 60-162766 (Oiwa) and U.S. Patent No. 5,953,969 (Rosenhan) and in witness of an Article by Liang et al. entitled "Low Pressure Plasma Arc Source Ion Nitriding Compared with Glow-Discharge Plasma Nitriding of Stainless Steel" (Liang), an Article by Blawert et al. entitled "Surface Treatment of Nitriding Steel 34CrAlNi7: Comparison between Pulsed Plasma Nitriding and Plasma Immersions ion Implantation" (Blawert), and book by Askeland entitled "The Science and Engineering of

Materials" (Askeland). Further, claims 2-3 and 11-12 are rejected under 35 U.S.C. §103(a) unpatentable over Domoto in view of U.S. Patent No. 5,857,260 (Yamada). Claim 15 is rejected under 35 U.S.C. §103(a) over Domoto in view of U.S. Patent No. 6,584,691 (Gerasimov). Claims 17 and 28 are rejected under 35 U.S.C. §103(a) over Domoto in view of U.S. Patent No. 4,259,126 (Cole). Applicants respectfully traverse and submit that claims 1-7, 10-17, and 25-28 5, as amended, are patentable over Domoto, Oiwa, Rosenhan, Liang, Blawert, Askeland, Yamada, Gerasimov and Cole for at least the following reasons.

Domoto is directed to a sliding member having a sliding surface 2 for sliding contact with a cooperative member. A protective film 5b is deposited not only on the sliding surface 2 but also on a surface region immediately adjacent the sliding surface 2. As correctly noted on page 5 of the Final Office Action, second paragraph, Domoto does not disclose or suggest that a cutting element is precipitationally hardened simultaneously with the plasma nitriding on all surfaces of the cutting element to form a surface top layer of steel supersaturated with nitrogen and a diffusion layer. Oiwa and Rosenhan are cited in an attempt to

remedy the deficiencies in Domoto.

Oiwa is directed to an electric razor where a dense nitride film is formed on the surface of the outer blade to improve the durability and to reduce a sliding load. The outer blade is made of Ni or stainless steel and the dense nitride film is formed on the surface of the outer blade by plasma nitriding.

Rosenhan is directed to screwdriver bit where its surface is hardened due to nitrating, and has softer region of a core. As clearly shown in FIG 2, the hardness decreases away from the center to reach a plateau near the center.

It is respectfully submitted that Domoto, Oiwa, Rosenhan, and combination thereof, do not teach or suggest the present invention as recited in independent claim 1, and similarly recited in independent claims 7, 10 and 17 which, amongst other patentable features, recites (illustrative emphasis provided):

wherein the cutting element is precipitationally hardened simultaneously with the plasma nitriding on all surfaces of the cutting element to form a surface top layer of steel supersaturated with nitrogen and a diffusion layer adjoining the top layer with a hardness ranging from the hardness of the top layer to the hardness of the steel before hardening so that the top layer has a

substantially uniform hardness and the diffusion layer has a continuously decreasing hardness with depth of the diffusion layer, the continuously decreasing hardness of the diffusion layer continuously decreasing from outer portions of the diffusion layer toward a center of the diffusion layer and meeting at the center of the diffusion layer to form a minimum peak at the center.

A cutting element which is precipitationally hardened simultaneously with the plasma nitriding is nowhere disclosed or suggested in Domoto Oiwa, and Rosenhan, alone or in combination. Rather, column 2, lines 27-29 of Rosenhan merely recites that "heat treatment--age-hardening or precipitation-hardening--is to be combined with plasma nitrating." It is respectfully submitted that such a disclosure does not teach or suggest to precipitationally harden a cutting element simultaneously with the plasma nitriding, as recited in independent claims 1, 7, 10 and 17.

Assuming, arguendo, that somehow the combination of Domoto, Oiwa and Rosenhan discloses or suggests to harden a cutting element simultaneously with the plasma nitriding, it is respectfully submitted that the combination of Domoto, Oiwa and Rosenhan still does not disclose or suggest a diffusion layer with continuously decreasing hardness that continuously decreases "from outer

portions of the diffusion layer toward a center of the diffusion layer and meeting at the center of the diffusion layer to form a minimum peak at the center," as recited in independent claim 1, and similarly recited in independent claims 7, 10 and 17. Rather, Rosenhan shows in FIG 2 that the hardness decreases away from the center to reach a plateau near the center. Liang, Blawert, Askeland, Yamada, Gerasimov and Cole are cited to allegedly show other features and do not remedy the deficiencies in Domoto, Oiwa and Rosenhan.


Accordingly, it is respectfully submitted that independent claims 1, 7, 10 and 17 should be allowable. In additions, claims 2-7, 11-16, and 25-28 should be allowable at least based on their dependence from independent claims 1, 7, 10 and 17.

In addition, Applicants deny any statement, position or averment of the Examiner that is not specifically addressed by the foregoing argument and response. Any rejections and/or points of argument not addressed would appear to be moot in view of the presented remarks. However, Applicants reserve the right to submit further arguments in support of the above stated position, should that become necessary. No arguments are waived and none of the

Examiner's statements are conceded.

In view of the above, it is respectfully submitted that the present application is in condition for allowance, and a Notice of Allowance is earnestly solicited.

Respectfully submitted,

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